

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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EXPERIMENTAL INVESTIGATION ON THERMALLY INDUCED VIBRATION OF FLEXIBLE
BOOM IN SPACE ENVIRONMENT USING VACUUM CHAMBER**Abstract**

In order to simulate the thermally-induced vibration phenomenon of the flexible thin boom structure of the spacecraft such as the thin solar panel and the flexible cantilever with the attached tip mass in space, the thermally-induced vibration including thermal flutter of the flexible thin boom with the concentrated tip mass was experimentally investigated at various thermal environments using a heat lamp and both vacuum and air condition using the vacuum chamber. Two types of test were conducted during the study: (1) thermally-induced vibration in atmospheric (2) thermally-induced vibration in vacuum. The test results that were to explain the phenomena of the thermally-induced vibration for the flexible space structure due to abrupt change of radiation heating circumstance. In order to investigate this, numerical approaches on the simplified flexible tube were compared with experimental test results at the various ground experimental facility. In this analyze, it was found that the thermal deformation occurred firstly due to fast radiation heating of flexible structure and then the thermally-induced vibration would be induced due to small periodic change of temperature.